

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 988 870 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
12.07.2000 Bulletin 2000/28

(51) Int. Cl.⁷: **A61M 25/10**

(43) Date of publication A2:
29.03.2000 Bulletin 2000/13

(21) Application number: **99118249.4**

(22) Date of filing: **14.09.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Duffy, Niall F.**
Tuam, Galway (IE)

(74) Representative:
Bauer, Friedrich, Dipl.-Ing. et al
Andrae Flach Haug
Prinzregentenstrasse 24
83022 Rosenheim (DE)

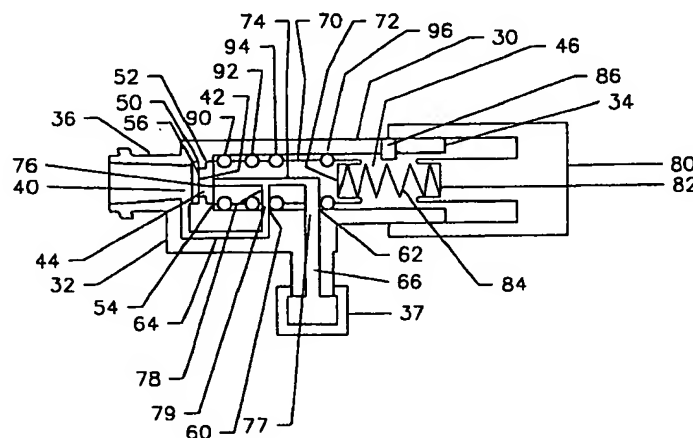
(30) Priority: **14.09.1998 US 152967**

(71) Applicant: **Medtronic AVE, Inc.**
Santa Rosa, California 95403 (US)

(54) Pressure limiting device

(57) An apparatus for limiting the pressure of inflation fluid injected into one or more balloon of a catheter device comprising a reservoir chamber having an inlet port coupled in fluid communication with an inflation/deflation device and a plurality of outlet ports coupled in fluid communication with a plurality of cylindrical housings. Each cylindrical housing includes a pressure chamber and a valve chamber. The valve chamber receives a piston moveable between a fully open position and a closed position and spring biased toward the fully open position. Each housing includes an outlet port coupled in fluid communication with a separate balloon of a catheter device. Each piston includes an internal

flow path which enables the flow of pressurized inflation fluid from the reservoir chamber to the balloon catheter when the pressure of the inflation fluid within the balloon is below the desired cut-off pressure. As the pressure of the inflation fluid within each balloon increases, the associated piston is urged toward its closed position. When the inflation fluid within the each balloon reaches the predetermined cut-off pressure level, the associated piston moves to the closed position and cuts-off the flow of inflation fluid from the reservoir chamber to the respective balloon.

**FIGURE 2****EP 0 988 870 A3**



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 11 8249

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 755 686 A (O'NEILL WILLIAM G ET AL) 26 May 1998 (1998-05-26) * the whole document *	1,11,21	A61M25/10
A	WO 98 31405 A (BOSTON SCIENT CORP) 23 July 1998 (1998-07-23) * the whole document *	1,11,21	
A	US 5 085 249 A (DRAGAN WILLIAM B ET AL) 4 February 1992 (1992-02-04) * the whole document *	1,11,21	
A	GB 2 243 553 A (SQUIBB & SONS INC) 6 November 1991 (1991-11-06) * the whole document *	1,11,21	
A	FR 2 673 524 A (VINCENT PAUL) 11 September 1992 (1992-09-11) * abstract; figures 1,2 *	1,11,21	
A	WO 95 33510 A (WILLIS ALLAN) 14 December 1995 (1995-12-14) * abstract; figures 1,3A-C *	1,11,21	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 4 333 452 A (AU ANTHONY S) 8 June 1982 (1982-06-08) * abstract; figure 5 *	1,11,21	A61M F16K F15B
A	GB 2 195 005 A (IRVING MICHAEL) 23 March 1988 (1988-03-23) * the whole document *	1	
A	EP 0 687 818 A (BOSCH GMBH ROBERT) 20 December 1995 (1995-12-20) * abstract; figure 1 *	1	
-/--			
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 10 May 2000	Examiner Jameson, P
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03 82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 11 8249

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	GB 2 046 527 A (AUTOMOTIVE PROD CO LTD) 12 November 1980 (1980-11-12) * the whole document *	1	
A	LANSKY & SCHRADER: "Industrial Pneumatic Control" 1986, MARCEL DEKKER, INC., NEW YORK XP002137391 824774 * page 6, paragraph 3 - page 8, paragraph 1 * * page 27, paragraph 1 - page 35, paragraph 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 10 May 2000	Examiner Jameson, P
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 11 8249

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-05-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5755686 A	26-05-1998	DE 19602140 A JP 8252327 A	01-08-1996 01-10-1996
WO 9831405 A	23-07-1998	NONE	
US 5085249 A	04-02-1992	NONE	
GB 2243553 A	06-11-1991	NONE	
FR 2673524 A	11-09-1992	NONE	
WO 9533510 A	14-12-1995	AU 2907395 A	04-01-1996
US 4333452 A	08-06-1982	US 4178938 A DE 2827648 A GB 2000259 A,B GB 2060826 A,B JP 54017526 A US 4178940 A	18-12-1979 18-01-1979 04-01-1979 07-05-1981 08-02-1979 18-12-1979
GB 2195005 A	23-03-1988	EP 0313694 A	03-05-1989
EP 0687818 A	20-12-1995	DE 4421357 A DE 59506757 D	21-12-1995 14-10-1999
GB 2046527 A	12-11-1980	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82